

**DITCHING AT SEA: PREDATOR AVOIDANCE BY THE  
ATLANTIC MARINE SHORELINE TIGER BEETLE,  
*CICINDELA MARGINATA* F.  
(COLEOPTERA: CARABIDAE)<sup>1</sup>**

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**ABSTRACT:** The stenotopic marine shoreline tiger beetle, *Cicindela marginata* responds to threat, presumably chiefly from shore birds, in its Atlantic tidal mud flats habitat by flying out over salt water and deliberately ditching. After a brief hesitation it flies off the water and returns to shore.

**KEY WORDS:** *Cicindela marginata*, Coleoptera, Carabidae, predator avoidance.

Along the shoreline mouth of estuarine Mattapoissett River (Mattapoissett, Plymouth County, Massachusetts), I observed a population of *Cicindela marginata* F. (Coleoptera: Carabidae: Cicindelinae) on tidal mud flats colonized by smooth cordgrass, *Spartina alterniflora* Loisel; ribbed mussel, *Geukensia demissa* (Dillwyn); and the mud fiddler crab, *Uca pugnax* (Smith). When threatened by my approach, these tiger beetles typically flew seaward a distance of circa 5 meters, landed briefly on the saltwater surface and then flew back to shore, often into dense cordgrass where they remained motionless for several minutes. My observations, on July 25, 2003, extended for circa two hours in bright sun and light winds, during which time I saw 20 or so such deliberate ditching flights.

### DISCUSSION

While Cicindelinae include many stenotopic species inhabiting shorelines more-or-less exclusively, there are almost no reports of water escape strategies to avoid predation. Larochelle and Lariviere (2001) state (without attribution) that *C. gabbii* (G.H. Horn) is "often seen floating backwards (sic) upon the ocean water near its shore habitat," seeming to imply a deliberate predator avoidance ditching flight such as I report herein for *C. marginata*. However, they do not specify a return *flight* to shore by *C. gabbii*. Detailed population studies of southern California stenotopic marine shoreline tiger beetles by Nagano (1982) included *C. gabbii* but he made no mention of sea ditching escape behavior, nor did he in his later article on California Channel Islands cicindelinae (Nagano 1985). Cazier (1954), in discussing that species, also does not mention this behavior.

Ditching behavior by *C. marginata* is not mentioned in three recent local natural histories of eastern cicindelinae (Glaser 1984, Knisley and Schultz 1997, Leonard and Bell 1999), and Gould (1834) notes only that adults retreat "to the high grass" when threatened, or when the tide comes in. In fact, in ten pages

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devoted to predator avoidance and escape strategies, Knisley and Schultz (1997) do not mention any strategy that involves water. Davis' (1903) report on Rhode Island tiger beetles does not include this species.

Pearson and Vogler (2001) devote a chapter to predator avoidance by tiger beetles but make no mention of water escape strategies. In their Appendix B (p. 276), however, they cite Cummin's (1992) report of an elaborate water escape behavior by a tropical Megacephalini species, *Oxycheila polita* Bates in Costa Rica, adding (without attribution) that of 46 known congeners many other *Oxycheila* species use this strategy, although Cummins (1992) does not mention this. *Oxycheila polita* forages along rocky edges of fast-flowing streams. When approached, it jumps or flies into turbulent water and is transported submerged up to "several hundred feet" whereupon it flies up and out of the water (Cummins 1992).

A less complex water escape strategy is reported for *C. marginata* by Johnson (1972) in his anecdotal Gulf Coast travelogue, collecting them in the Florida Keys with some difficulty because they often avoided him by flying out over salt water, but he does not mention ditching. In another southeastern tiger beetle collecting travelogue, Lawton (1970) notes that of an abundant *C. marginata* population in the Florida Keys, every shoreline escape flight was made "well out over the water for some distance" rather than upbeach or inland. This same tactic is reported for *C. hamati monti* Vaurie, that flies out over open water of freshwater pools on South Padre Island, Texas, to avoid predation (Ideker 1977). I have seen *C. repanda* Dejean do this along sandy beaches of Lake Erie, east of Cleveland, Ohio. Given the very close proximity of shorelines to populations of many tiger beetle species, it would not be surprising if adults routinely made use of water overflights to evade collection by humans and shore birds.

Amphibious behavior by tiger beetle adults has been reported in other contexts. Larochelle and Lariviere (2001) mention that *C. nevadica knausii* Leng and *C. willistoni echo* Casey enter shallow water (2.5 cm. deep) on foot, presumably to hunt for prey. *Cheiloxia binotata* Castelnau flies in large swarms low over Peruvian rivers at dusk and throughout the night, regularly skating on the water surface in pursuit of prey (Pearson 1984). Nocturnal ocean foraging by a tiger beetle was reported by Roth and Brown (1980). They cited J. R. Hendrickson's (personal communication) report of *C. sinaloae schrammeli* Cazier landing at night on the Gulf of California six miles out to feed on arrowworms (Chaetognatha), some species of which are luminescent, which may be relevant to their accessibility to a nocturnal predator. This precinctive subspecies is known only from marine shorelines in Mexico at the head of the Gulf in Sonora and Baja California (Cazier 1954).

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